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SURFACE CURRENTS. EAST CENTRAL NORTH ATLANTIC OCEAN. (U)

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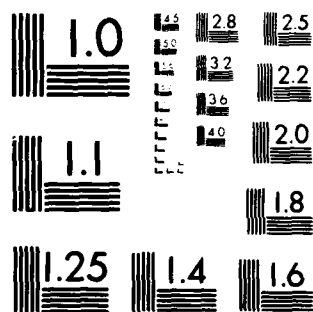
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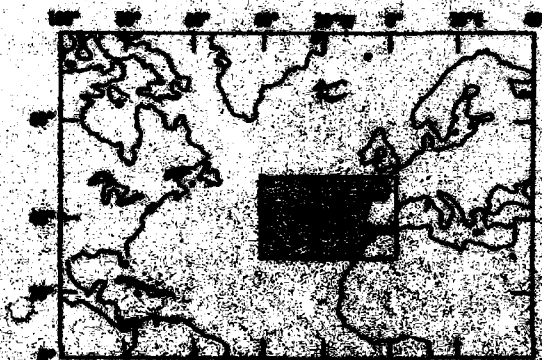
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NAVAL OCEANOGRAPHIC OFFICE SPECIAL PUBLICATION 1400-NA 7

# SURFACE CURRENTS

EAST CENTRAL NORTH ATLANTIC OCEAN

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## ABSTRACT

THIS STUDY, AND THE DESIGN OF WHICH IT IS A PART, IS COM-  
PUTER GENERATED AND AUTOMATICALLY CONTROLLED. IT CONSISTS OF  
THE USE OF THE BASIC ARITHMETIC PROGRAMS AND LOGIC AND THE  
UPDATED UNIVERSAL LOGIC PROGRAMS OF THE ARITHMETIC AND LOGIC  
FILE. THIS AND THE OTHER LOGIC AND ARITHMETIC PROGRAMS  
DATA AS COMPARED TO THE PREVIOUS LOGIC AND ARITHMETIC  
IN THE NEW-LOGIC.

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# SURFACE CURRENTS.

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(9) Final rept.

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#### ACKNOWLEDGMENTS

Messrs. Raymond J. Beauchesne\* and William E. Boisvert made major contributions to this atlas.

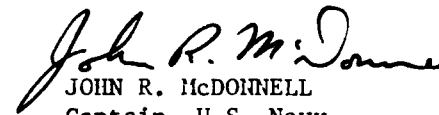
\*Mr. Beauchesne presently is employed by the Bureau of Naval Personnel.



## FOREWORD

THIS ATLAS, ONE IN A SERIES OF 43 REGIONAL SURFACE CURRENTS, IS PRODUCED TO FULFILL A NEED OF NAVY PLANNING STAFFS AND THE SCIENTIFIC AND INDUSTRIAL COMMUNITIES FOR THE LATEST AVAILABLE OCEAN SURFACE CURRENT DATA. THESE ATLASES ADD TO THE WEALTH OF NAUTICAL INFORMATION UPON WHICH NAVAL OPERATIONAL PLANNING, NAVIGATIONAL SAFETY, AND SHIPPING ECONOMY DEPEND. THE PRODUCTION AND WIDE DISSEMINATION OF THIS ATLAS ARE MADE POSSIBLE BY THE LATEST COMPUTER TECHNIQUES.

THE CONSTANT IMPROVEMENT IN THE QUALITY OF SURFACE CURRENT DATA RECEIVED OVER THE YEARS IS MADE POSSIBLE LARGELY BY THE MORE THOROUGH OBSERVATIONS OF VOLUNTARY OBSERVERS IN RECENT YEARS. THE DEFENSE MAPPING AGENCY, THE OCEANOGRAPHIC OFFICE, AND THE USER OF THE ATLASES RELY ON THE PERSONAL OBSERVATIONS OF THE MAN WHO HAS "BEEN THERE." MARINERS, IN REPORTING OBSERVATIONS, RENDER A SERVICE NOT ONLY TO THEMSELVES BUT ALSO TO THE NAVY THAT GOES DOWN TO THE SEA IN SHIPS." WITH THE ADVENT OF NUCLEAR POWER, MISSILES, NAVIGATION AIDS, AND 300,000-TON SHIPS, UP-TO-DATE, RAPIDLY DISSEMINATING ENVIRONMENTAL AND NAVIGATIONAL INFORMATION HAS BECOME INCREASINGLY

  
JOHN R. McDONNELL  
Captain, U.S. Navy  
Commander

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*John R. McDonnell*

JOHN R. McDONNELL  
Captain, U.S. Navy  
Commander

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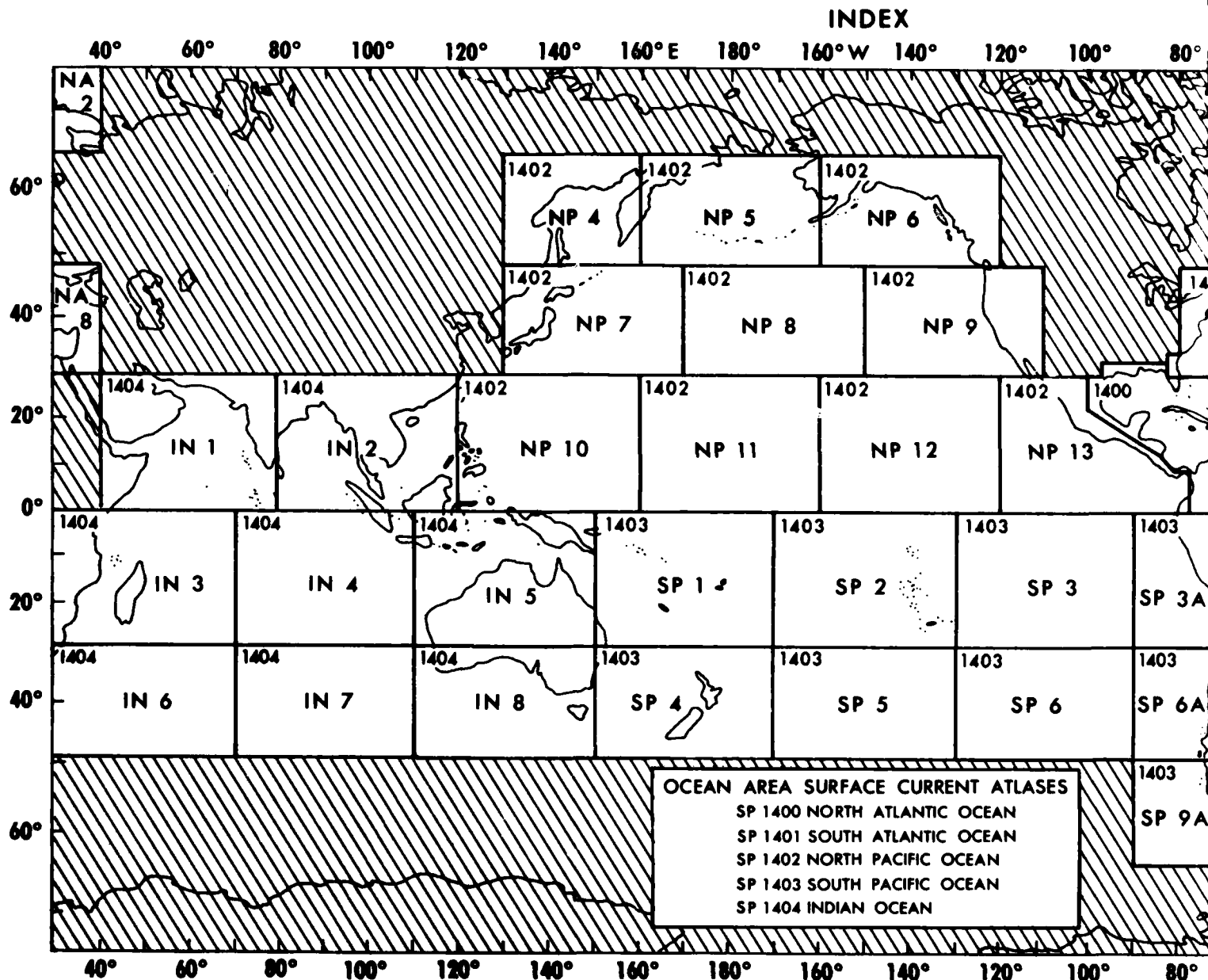
## SURFACE CURRENT ATLASES

THIS SERIES OF COMPUTERIZED ATLASES REPLACES THE OLD HYDROGRAPHIC OFFICE ATLASES OF SURFACE CURRENTS (HOP 566, 568, 569, 570) WHICH WERE MANUALLY COMPILED FROM DATA OBTAINED DURING THE PERIOD 1903 - 1934. THESE NEW ATLASES CONFORM TO THE STANDARD NAVY OCEAN AREA AND REGION INDEX LIMITS SHOWN BELOW: e.g., NOO SP 1402-NP 10 COVERS NORTH PACIFIC REGION 10 EAST OF THE PHILIPPINES.

AS AMOUNTS OF NEW DATA WARR

THESE GRAPHICS MAY NOT  
AREAS AS THE NORTH SEA, PER  
CURRENTS ARE STRONGLY TIDAL  
PREDICTABLE HOURLY CHANGES

RECENT IMPROVEMENTS IN THE DATA FILE ASSURE THE INCLUSION OF THE LATEST, HIGH QUALITY SURFACE CURRENT DATA AVAILABLE. THE FILE NOW CONTAINS MORE THAN 4,200,000 OBSERVATIONS AND A GENERAL UPDATE OF THE FILE WILL BE MADE

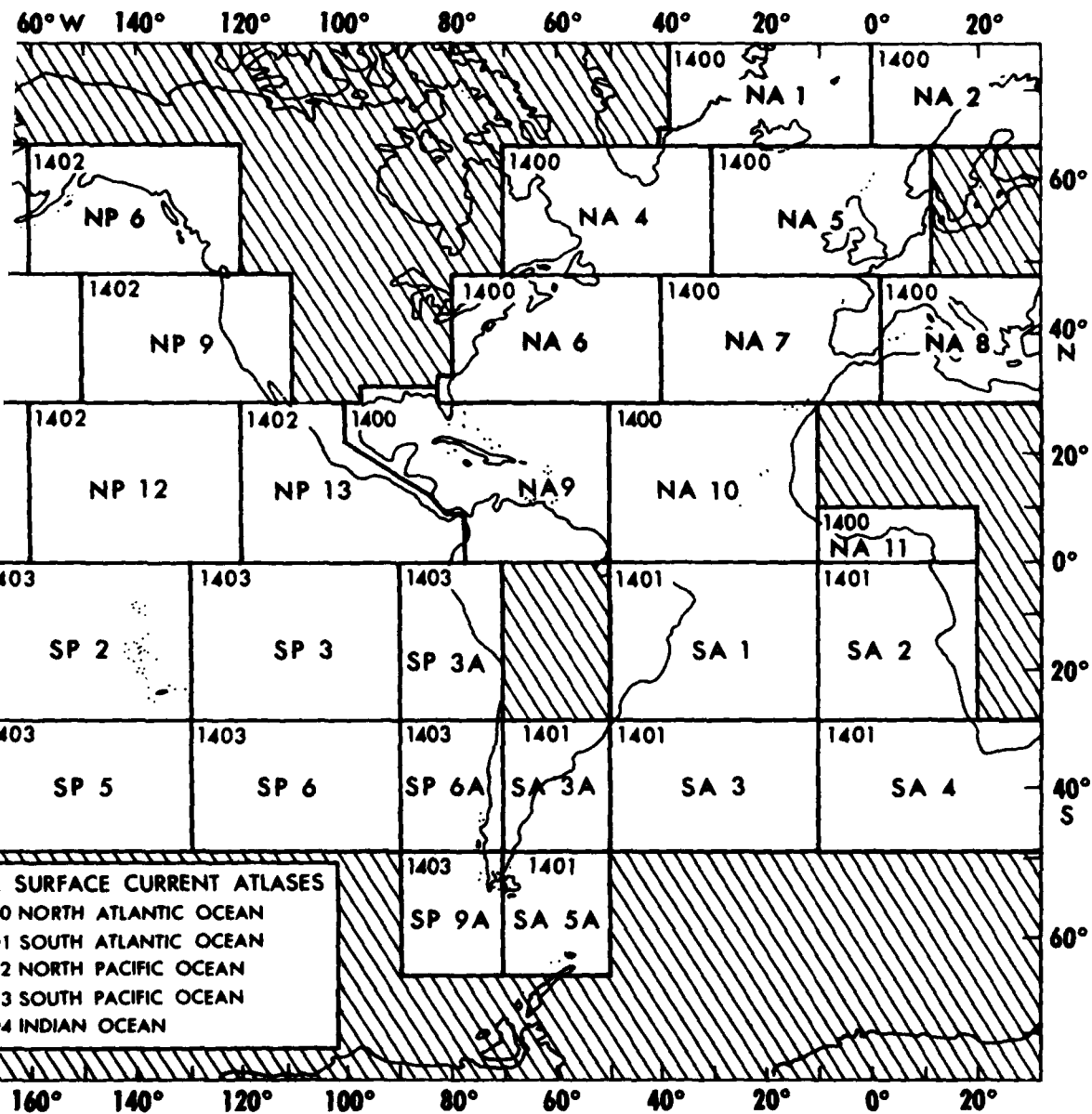


# CURRENT ATLASES

AS AMOUNTS OF NEW DATA WARRANT, MOST LIKELY EVERY 12 - 18 MONTHS.

THESE GRAPHICS MAY NOT BE TRULY REPRESENTATIVE OF THE ACTUAL FLOW IN SUCH AREAS AS THE NORTH SEA, PERSIAN GULF, GULF OF THAILAND, AND YELLOW SEA WHERE CURRENTS ARE STRONGLY TIDAL. FOR SUCH AREAS, OTHER SOURCES DESCRIBING PREDICTABLE HOURLY CHANGES OF TIDAL CURRENTS SHOULD BE CONSULTED.

## INDEX



If there are 12 or more of  
by vector resultants as to

The quality of this data file is considered high for this type of derived value. The data have been carefully screened for duplication; observations taken under adverse conditions (i.e. high winds and waves, time between observations greater than 12 hours) have been eliminated when warranted. Consideration was given to the reliability of the observer; doubtful shipboard computations of set and drift were edited; and observations with erroneous locations (mostly observations on land) have been eliminated. The accepted data are considered most useful when used collectively as in summaries where a number of observations show trends.

The set (direction) and drift (speed) are computed by the navigator from the difference between the dead reckoning (DR) position and the position determined by any type of navigational fix. The drift can be determined along any straight line track and includes all factors which cause changes in the DR position. When a fix is obtained, the current set (direction) is FROM the DR position TO the fix; the drift (speed) is equal to the distance in nautical miles between the DR and the fix, divided by the number of hours since the last fix. For successive observations, the TO POSITION of one observation becomes the FROM POSITION of the next observation.

(1) Persistent Current - 60 percent or more of all observations fall within a 45° sector of the 8-point compass.

45°W 44°W

42°N

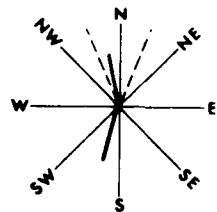
AB COURSE STEERED, 075°T; SPEED, 12 KN  
 AC COURSE MADE GOOD, 082°T; SPEED, 13 KNS.  
 BC CURRENT SET, 138°T; SPEED, 1.8 KN  
 D GEOGRAPHIC PLOT OF CURRENT OBS.

42°12'  
 42°06'  
 42°00'

44°48' 44°36' 44°24' 44°12' 44°00'

1.8 KN

### EXAMPLE OF A SURFACE CURRENT (SHIP'S DRIFT) OBSERVATION



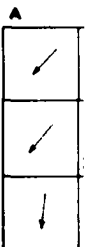
(4) **Bizonal Flow** - Practically all of the fish are concentrated in opposite pair sectors, and one pair contains at least 80 percent as many observations as the other pair. This generally indicates that occurs in zones of entrainment of opposing currents (see examples in quadrangles 1, 2, and 3).

## LEGEND

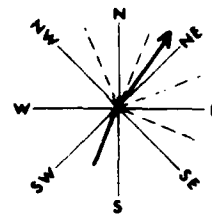
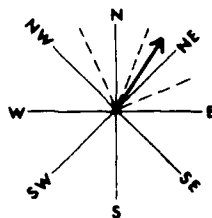
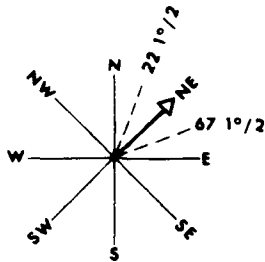
**TYPE 1**

**TYPE 2**

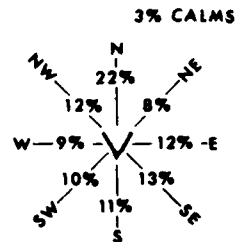
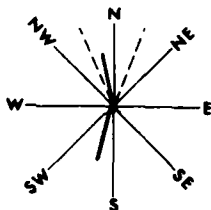
- A** NUMBER OF CALMS (INCLUDED IN TOTAL OBSERVATIONS).
- B** TOTAL OBSERVATIONS (999 ALSO USED FOR 1000 OR MORE OBSERVATIONS).
- C** MEAN SPEED (0.8 KNOT) FOR ALL OBSERVATIONS.
- D** VECTOR RESULTANT DIRECTION ("T) FOR ALL OBSERVATIONS.
- E** PERCENT FREQUENCIES (57% PRIMARY DIRECTION, 23% SECONDARY DIRECTION).
- F** MEAN SPEEDS (1.0 KNOT PRIMARY DIRECTION, 0.6 KNOT SECONDARY DIRECTION).
- G** NUMBER OF OBSERVATIONS BY QUADRANT.



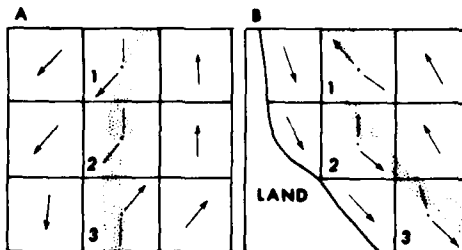
If there are 12 or more observations in a 1° quadrangle, the surface current is depicted by vector resultants as follows:



- (1) Persistent Current - 60 percent or more of all observations fall within a 45° sector of the 8-point compass.
- (2) Prevailing Current - 70 percent or more of all observations fall within two adjacent 45° sectors.
- (3) Primary Current with Secondary Direction
  - (a) Primary Current - 50 percent or more of all observations fall within three adjacent 45° sectors.
  - (b) Secondary Direction - 20 percent or more of all observations fall within a 45° sector, and the two resultant vector directions are separated by more than 90° of arc.



- (4) Bizonal Flow - Practically all observations are concentrated in opposite pairs of 45° sectors, and one pair contains at least 80 percent as many observations as the opposite pair. This generally indicates variability that occurs in zones of entrainment between opposing currents (see examples A and B, quadrangles 1, 2, and 3).
- (5) Variable Current - The 45° sector with most observations has less than 25 percent of all observations; direction is indeterminate.



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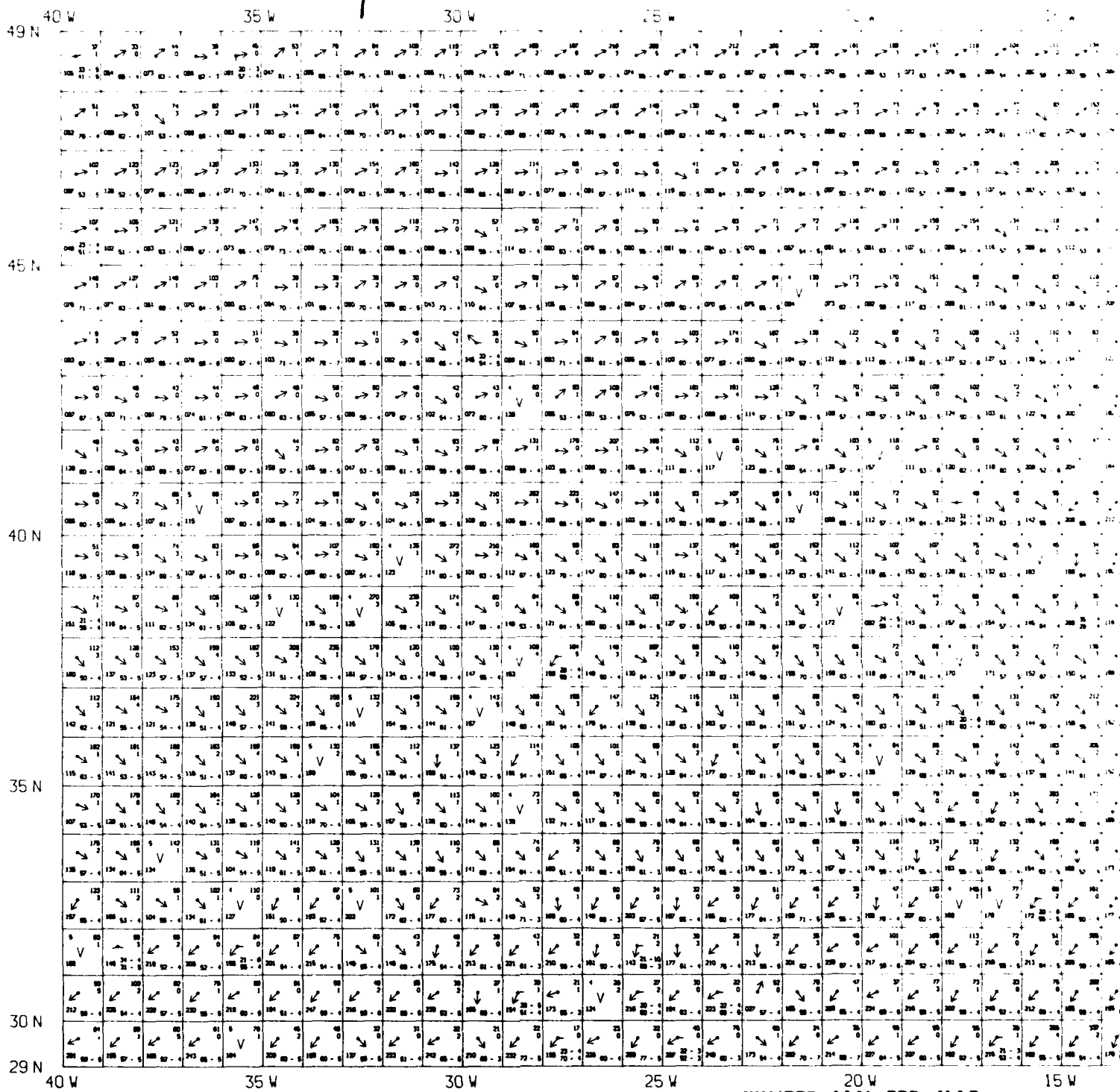
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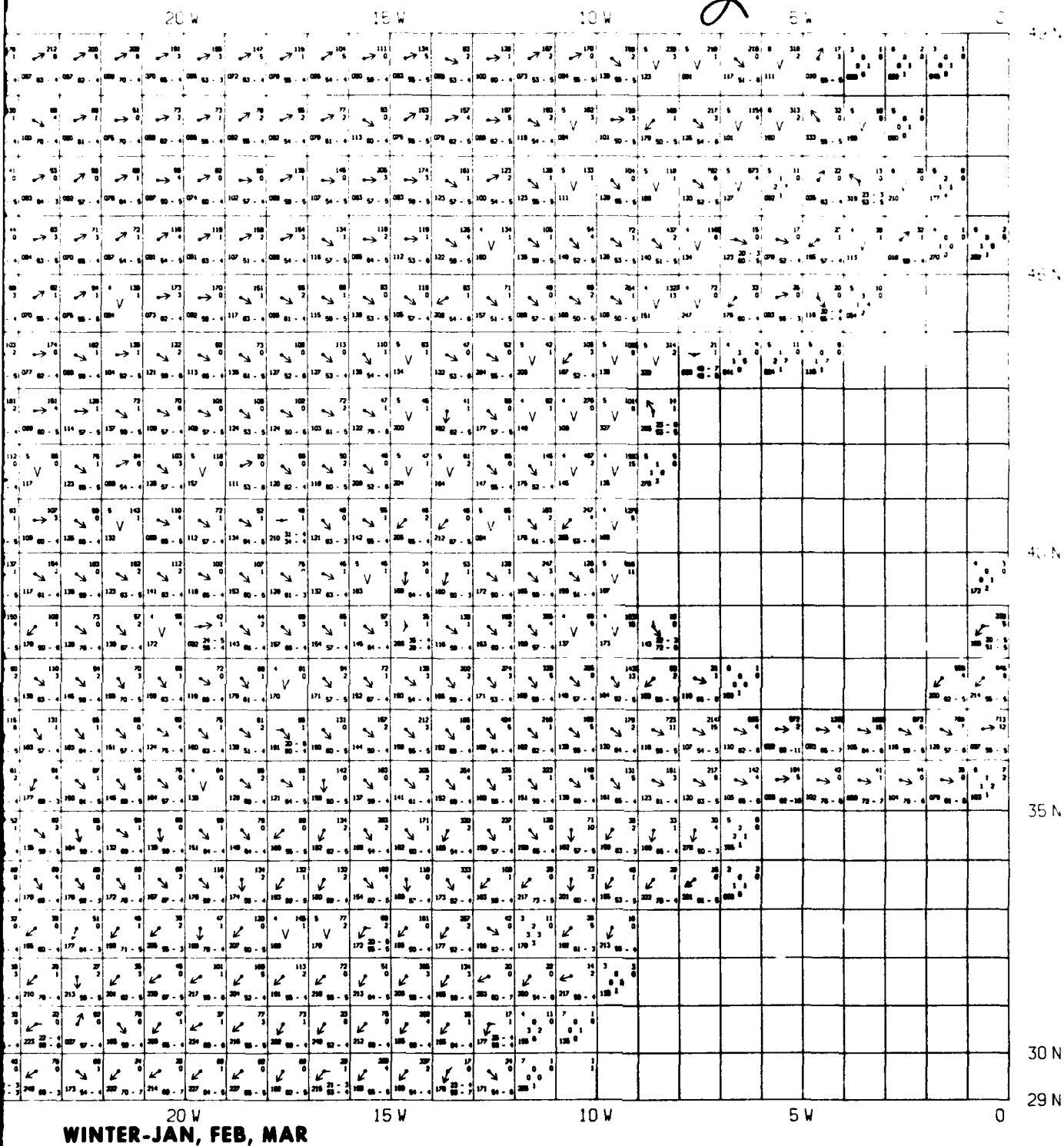
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WINTER-JAN, FEB, MAR

2





49 N 40 W

45 N

40 N

35 N

30 N

29 N 40 W

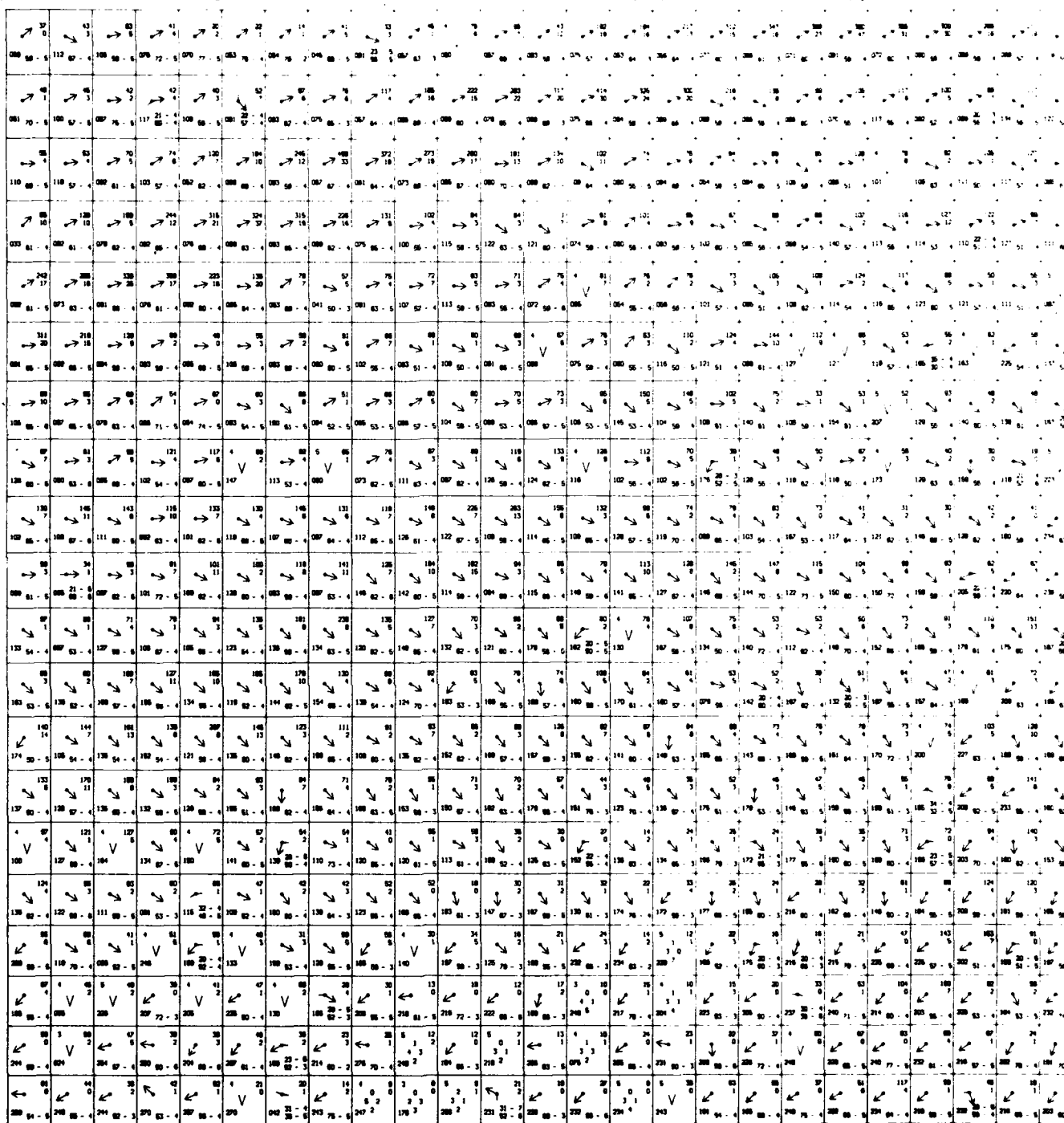
35 W

30 W

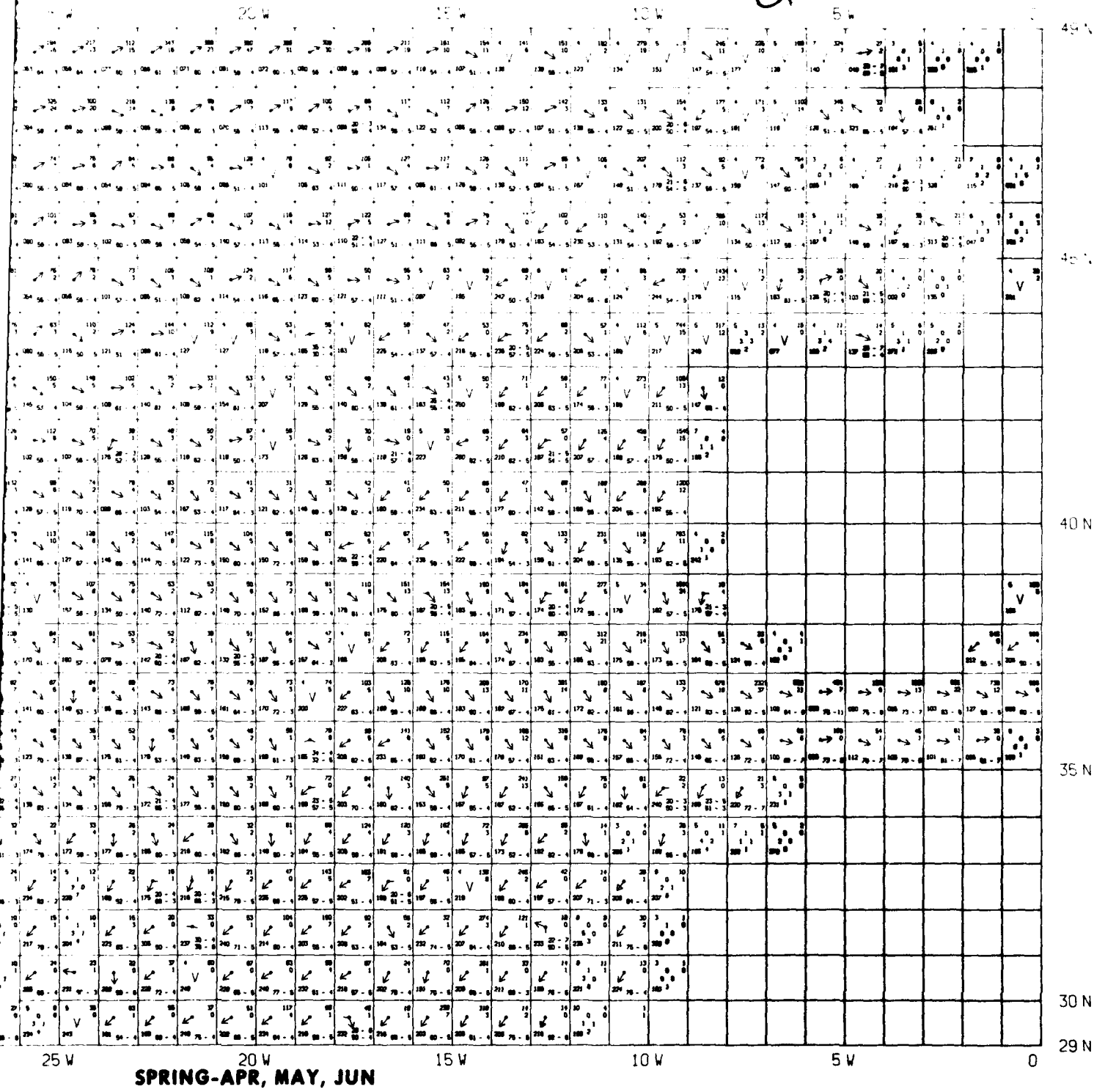
25 W

20 W

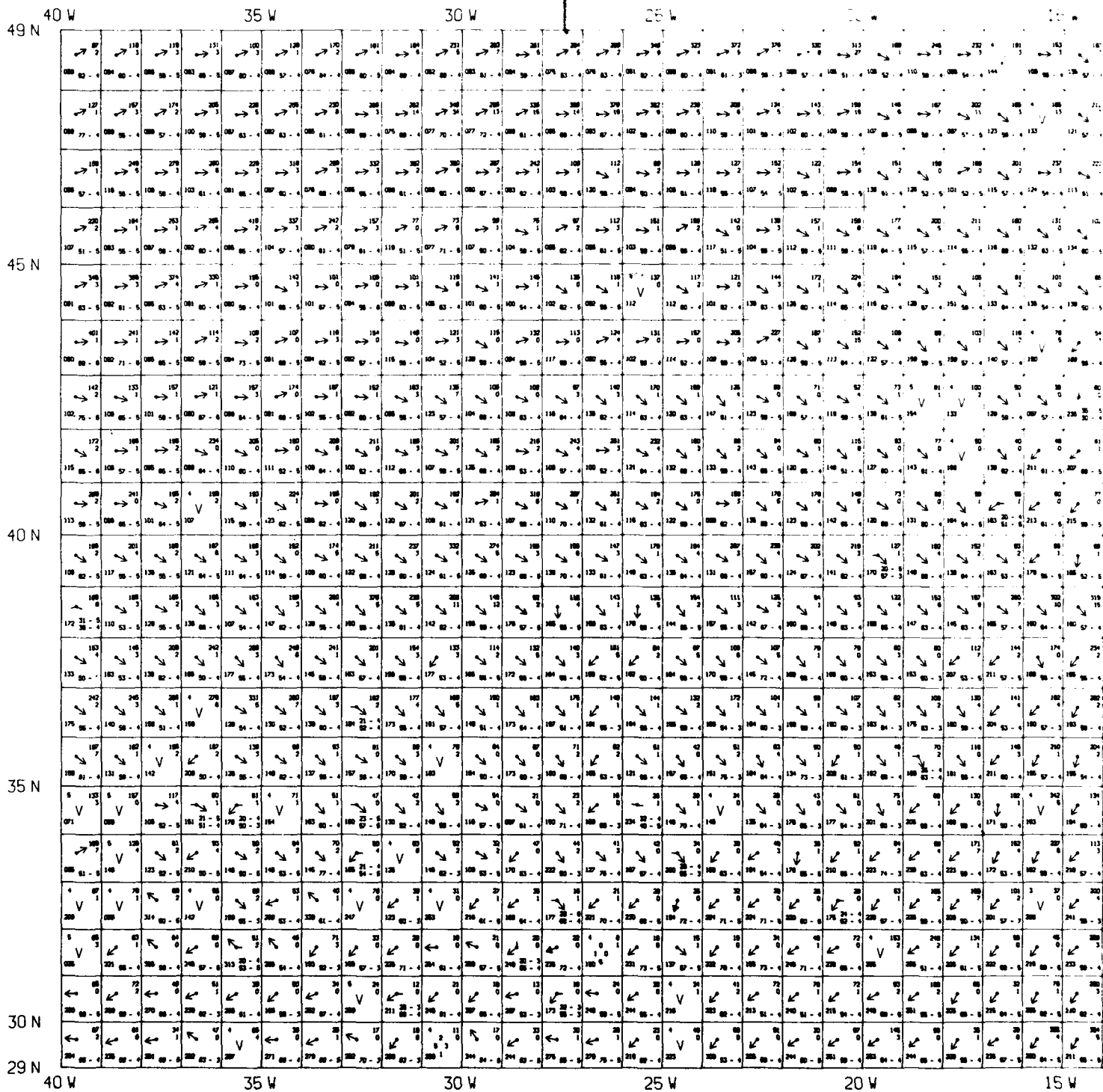
SPRING-APR, MAY, JUN

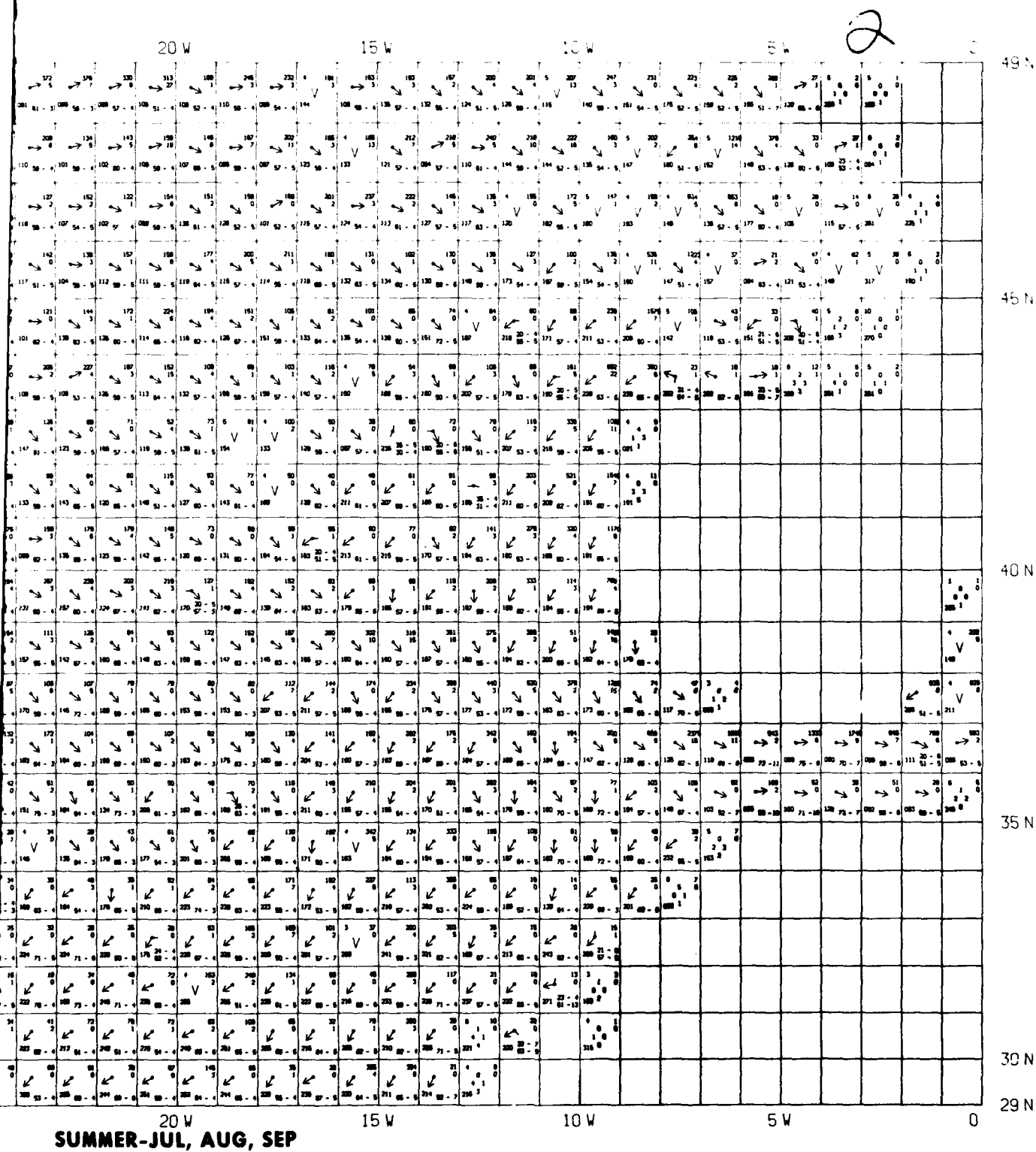


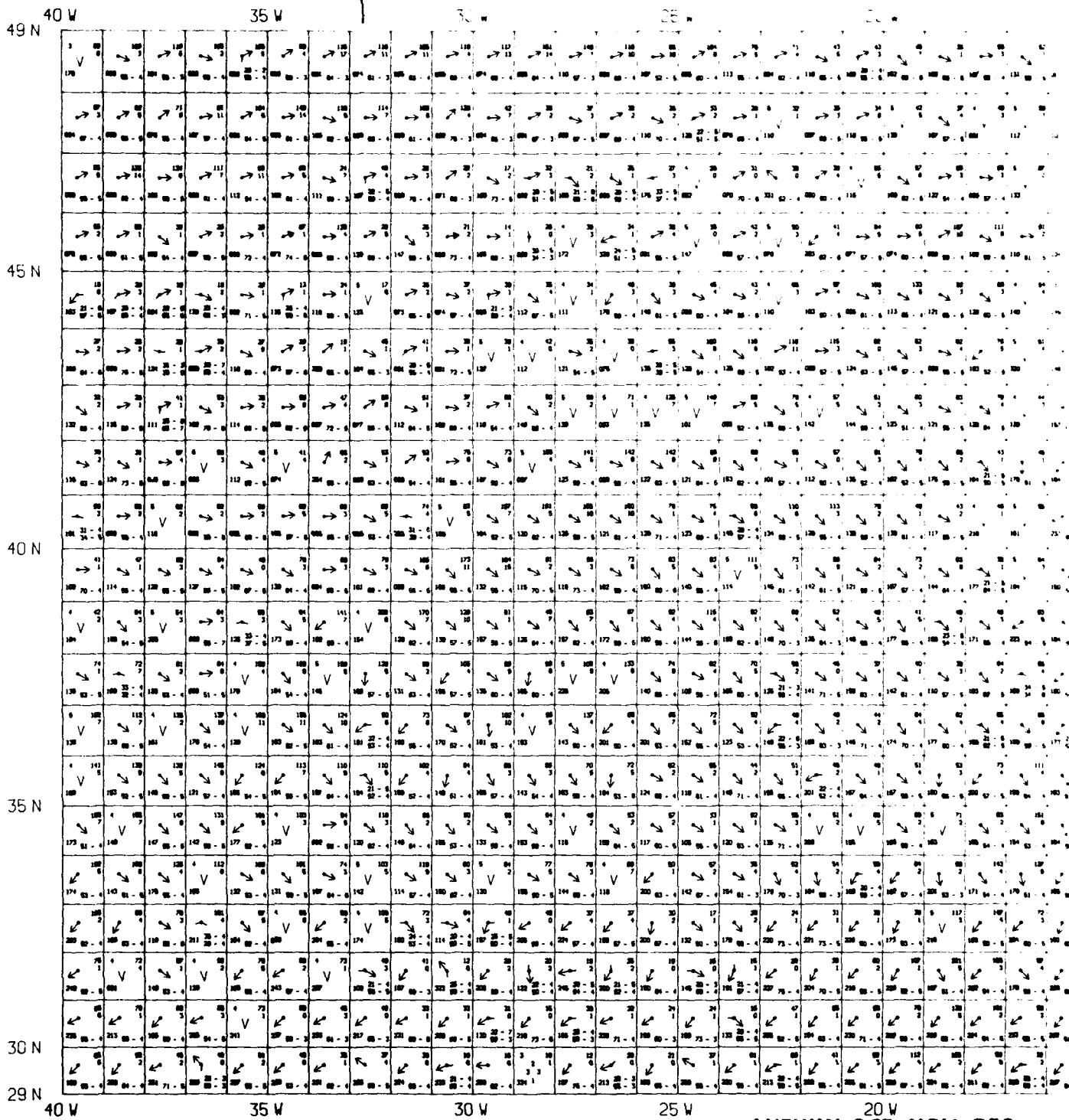
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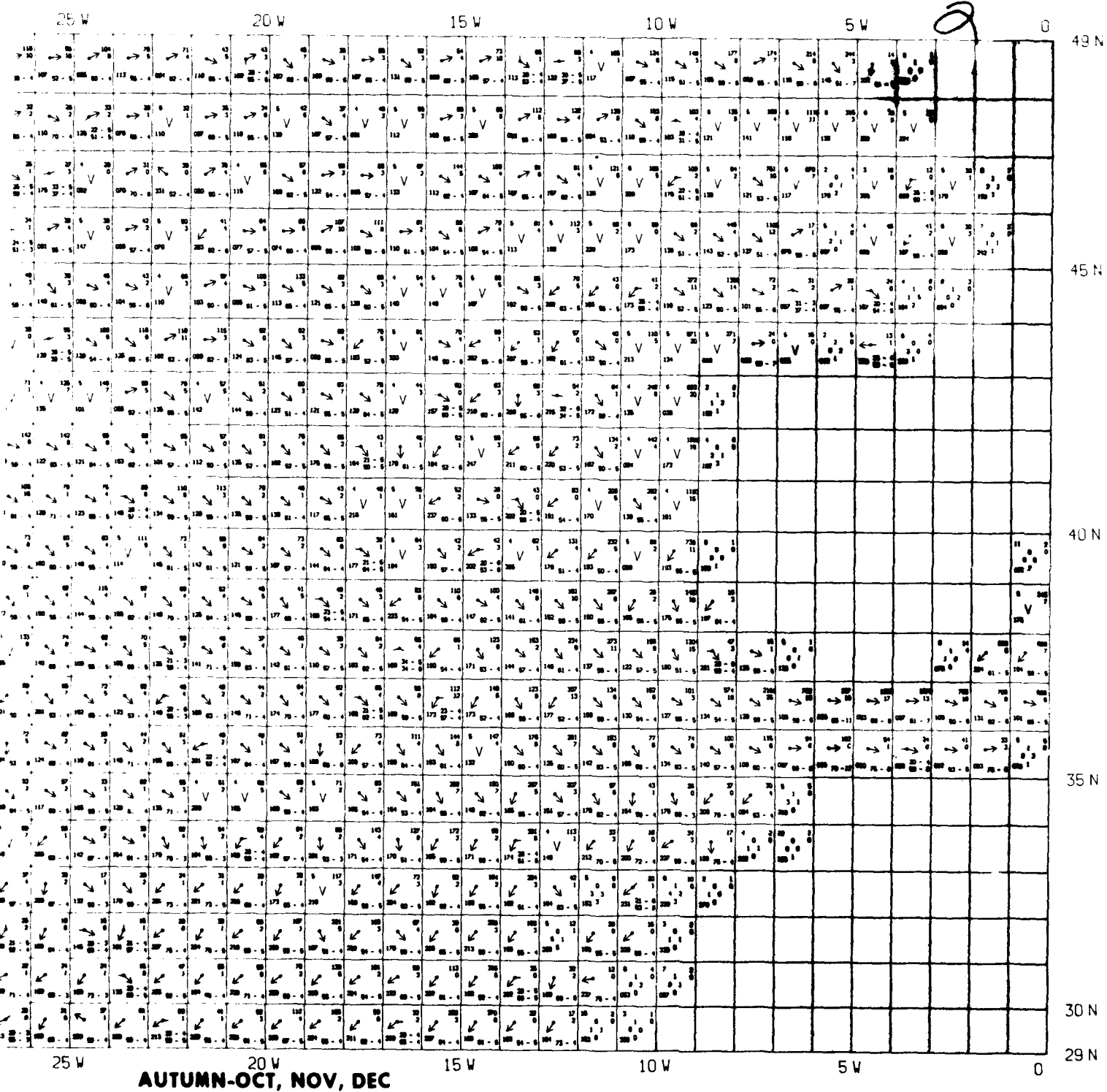


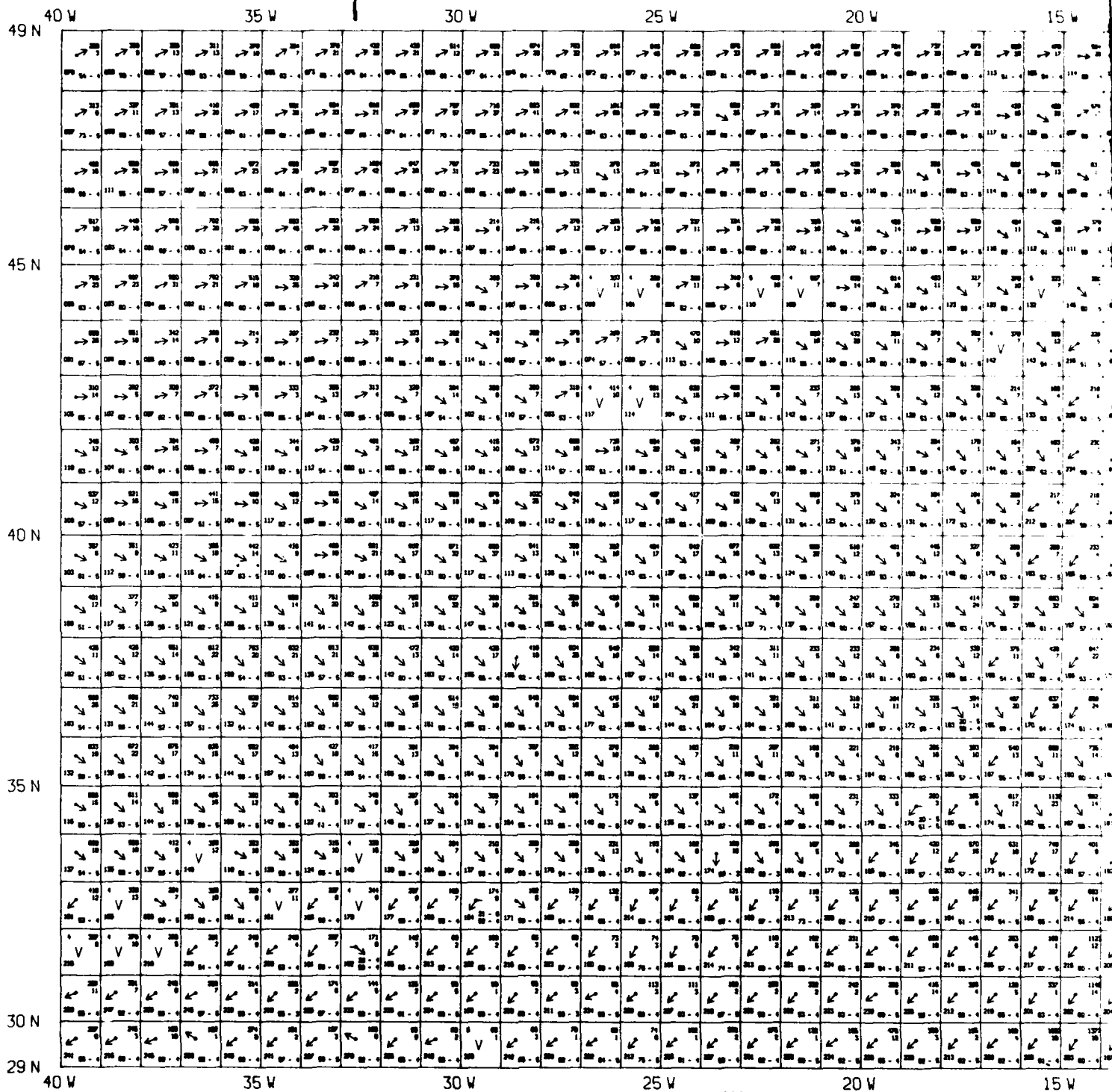
SPRING-APR, MAY, JUN











2

20 W

15 W

10 W

5 W

0

49 N

45 N

40 N

35 N

30 N

29 N

20 W

15 W

10 W

5 W

0

JAN-JAN THROUGH DEC



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21. ABSTRACT (Continue on reverse side if necessary and identify by block number) This atlas, and the series of which it is a part, is computer generated and automatically plotted. It makes available to the user the most recent surface current data collected and will be updated whenever sufficient amounts of data are added to the data file. This and the other atlases are based on a vast quantity of data as compared to the previous manually-compiled editions printed in the mid-thirties.			

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20. Cont.

The surface current information is based mainly on ship drift, which is the difference between the dead reckoning position and the position determined by any type of navigational fix. This difference describes the direction and speed of the current.

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